

What is claimed is:

1        1. A time managing apparatus that manages times clocked  
2 by a plurality of timer modules in apparatuses connected to each  
3 other on a network, the time managing apparatus comprising:  
4        a holding means for holding event start time information  
5 that indicates an event start time at which one or more events  
6 should be started by two or more apparatuses on the network;  
7        a time requesting means for requesting a timer module to  
8 transmit a standard time;  
9        a time receiving means for receiving the standard time;  
10       a judging means for judging whether the event start time  
11 is reached, by comparing the received standard time with the  
12 event start time; and  
13       an instructing means for instructing the two or more  
14 apparatuses to start executing the one or more events when the  
15 judging means judges that the event start time is reached.

1        2. The time managing apparatus of Claim 1, wherein  
2        the holding means holds presetting information which  
3 contains, as a pair, the event start time information and a module  
4 identifier of the timer module, and  
5        the time requesting means requests the timer module having  
6 the module identifier to transmit the standard time.

1        3. The time managing apparatus of Claim 2, wherein  
2        when the judging means judges that the event start time  
3 is reached, the instructing means transmits triggers [for the

4 one or more events] to the two or more apparatuses so that the  
5 two or more apparatuses start executing the one or more events  
6 simultaneously.

1 4. The time managing apparatus of Claim 2, wherein  
2 the presetting information further contains, for each  
3 event, (a) event type information indicating an event type and  
4 (b) an apparatus identifier of an apparatus that should execute  
5 the event, and

6 when the judging means judges that the event start time  
7 is reached, the instructing means transmits pieces of event type  
8 information corresponding to the one or more events to  
9 apparatuses having apparatus identifiers corresponding to the  
10 one or more events so that the apparatuses start executing the  
11 one or more events simultaneously.

1 5. The time managing apparatus of Claim 4 further  
2 comprising:

3 a presetting information receiving means for receiving  
4 presetting information from outside and getting the holding means  
5 to hold the received presetting information; and

6 a module identifier storage means for storing module  
7 identifiers by correlating the module identifiers with at least  
8 one of event type information and apparatus identifiers, the  
9 module identifiers being received by the presetting information  
10 receiving means together with the presetting information,  
11 wherein

12 if the presetting information receiving means receives  
13 at least one of a piece of event type information and an apparatus  
14 identifier together with the presetting information, the  
15 presetting information receiving means searches the module  
16 identifier storage means for a module identifier that correlates  
17 with the received piece of event type information and/or  
18 apparatus identifier, and if the presetting information  
19 receiving means finds such a module identifier, the presetting  
20 information receiving means allows the found module identifier  
21 to be selected automatically.

1 6. A time managing apparatus that manages times clocked  
2 by a plurality of timer modules in apparatuses connected to each  
3 other on a network, the time managing apparatus comprising:

4 a presetting information receiving means for receiving  
5 from outside (a) event start time information that indicates  
6 an event start time at which one or more events should be started  
7 by two or more apparatuses on the network, (b) event type  
8 information indicating an event type for each of the one or more  
9 events, and (c) apparatus identifiers of apparatuses that should  
10 execute the one or more events;

11 a time receiving means for receiving a standard time from  
12 a timer module;

13 a time managing means for managing the received standard  
14 time;

15 a presetting information transmitting means for  
16 transmitting the received event start time and event type

17 information to the apparatuses identified by the received  
18 apparatus identifiers;  
19 a standard time acquisition request receiving means for  
20 receiving a standard time acquisition request from each of the  
21 apparatuses; and  
22 a standard time transmitting means for transmitting the  
23 standard time to each of the apparatuses.

1 7. The time managing apparatus of Claim 6, wherein  
2 the time managing means manages the times clocked by the  
3 plurality of timer modules using different pieces of management  
4 information assigned to the plurality of timer modules,  
5 the presetting information receiving means further  
6 receives a piece of management information that corresponds to  
7 the received event start time,  
8 the time receiving means receives a standard time from  
9 a timer module corresponding to the received piece of management  
10 information,  
11 the presetting information transmitting means further  
12 transmits the received piece of management information to the  
13 apparatuses,  
14 the standard time acquisition request receiving means  
15 receives a standard time acquisition request and a piece of  
16 management information attached to the standard time acquisition  
17 request, from each of the apparatuses, and  
18 the standard time transmitting means transmits, to each  
19 of the apparatuses, the standard time received from the timer

20 module corresponding to the received piece of management  
21 information.

1 8. The time managing apparatus of Claim 7 further  
2 comprising:

3 a time output requesting means for requesting the timer  
4 module corresponding to the received piece of management  
5 information to output the standard time, wherein

6 the time receiving means receives the standard time from  
7 the timer module requested by the time output requesting means  
8 to output the standard time.

1 9. The time managing apparatus of Claim 8 further  
2 comprising:

3 a management information storage means for storing the  
4 piece of management information received by the presetting  
5 information receiving means, by correlating the piece of  
6 management information with at least one of a piece of event  
7 type information and two or more apparatus identifiers, wherein

8 if the presetting information receiving means receives  
9 at least one of a piece of event type information and an apparatus  
10 identifier, the presetting information receiving means searches  
11 the management information storage means for a piece of  
12 management information that correlates with the received piece  
13 of event type information and/or apparatus identifier, and if  
14 the presetting information receiving means finds such a piece  
15 of management information, the presetting information receiving

16 means allows the found piece of management information to be  
17 selected automatically.

1 10. A time managing apparatus that manages times clocked  
2 by a plurality of timer modules in apparatuses connected to each  
3 other on a network, the time managing apparatus comprising:  
4 a presetting information receiving means for receiving  
5 from outside (a) event start time information that indicates  
6 an event start time at which one or more events should be started  
7 by two or more apparatuses on the network, (b) a module identifier  
8 of a timer module, (c) event type information indicating an event  
9 type for each of the one or more events, and (d) apparatus  
10 identifiers of apparatuses that should execute the one or more  
11 events;  
12 a time output requesting means for requesting the timer  
13 module identified by the received module identifier to output  
14 a standard time;  
15 a time receiving means for receiving the standard time  
16 from the timer module; and  
17 a presetting information transmitting means for  
18 transmitting the received event start time and event type  
19 information, and transmitting the standard time, to the  
20 apparatuses identified by the received apparatus identifiers.

1 11. The time managing apparatus of Claim 10 further  
2 comprising:  
3 a module identifier storage means for storing the received

4 module identifier by correlating the module identifier with at  
5 least one of a piece of event type information and two or more  
6 apparatus identifiers, wherein

7 if the presetting information receiving means receives  
8 at least one of a piece of event type information and an apparatus  
9 identifier, the presetting information receiving means searches  
10 the module identifier storage means for a module identifier that  
11 correlates with the received piece of event type information  
12 and/or apparatus identifier, and if the presetting information  
13 receiving means finds such a module identifier, the presetting  
14 information receiving means allows the found module identifier  
15 to be selected automatically.

1 12. A time managing apparatus that manages times clocked  
2 by a plurality of timer modules in apparatuses connected to each  
3 other on a network, the time managing apparatus comprising:

4 a designation receiving means for receiving designation  
5 by a user of a timer module among the plurality of timer modules,  
6 the timer module being to be used as a standard timer module  
7 for synchronization;

8 a time requesting means for requesting the designated timer  
9 module to output a standard time;

10 a time receiving means for receiving the standard time  
11 from the requested timer module; and

12 a time transmitting means for transmitting the  
13 received standard time to the other timer modules among the  
14 plurality of timer modules excluding the timer module that output

15 the standard time, instructing the other timer modules to  
16 synchronize times thereof with the transmitted standard time.

1 13. A time managing apparatus that manages times clocked  
2 by a plurality of timer modules in apparatuses connected to each  
3 other on a network, the time managing apparatus comprising:  
4 a presetting information receiving means for receiving  
5 (a) event start time information that indicates an event start  
6 time at which one or more events should be started by two or  
7 more apparatuses on the network, (b) a piece of management  
8 information, and (c) event type information indicating an event  
9 type for each of the one or more events, from an apparatus that  
10 vicariously manages the times clocked by the plurality of timer  
11 modules using different pieces of management information  
12 assigned to the plurality of timer modules;  
13 a holding means for holding the received event start time,  
14 piece of management information, and event type information;  
15 a time acquisition request transmitting means for  
16 transmitting to the apparatus a time acquisition request with  
17 the received piece of management information attached thereto;  
18 a time receiving means for receiving from the apparatus  
19 a standard time identified by the transmitted piece of management  
20 information;  
21 a judging means for judging whether the event start time  
22 is reached by comparing the received standard time with the event  
23 start time; and  
24 an executing means for starting to execute an event that



25 is indicated by the event type information held by the holding  
26 means when the judging means judges that the event start time  
27 is reached.

1 14. A time managing apparatus that manages times clocked  
2 by a plurality of timer modules in apparatuses connected to each  
3 other on a network, the time managing apparatus comprising:

4 a time clocking means for clocking a local time for the  
5 time managing apparatus itself;

6 a presetting information receiving means for receiving  
7 (a) event start time information that indicates an event start  
8 time at which one or more events should be started by two or  
9 more apparatuses on the network, (b) event type information  
10 indicating an event type for each of the one or more events,  
11 from an apparatus on the network, the presetting information  
12 receiving means also continuously receiving a standard time from  
13 a time module;

14 a time difference calculating means for calculating a time  
15 difference between the local time received from the time clocking  
16 means and the standard time;

17 a holding means for holding the received event start time  
18 and type information and the calculated time difference;

19 a judging means for judging whether the event start time  
20 is reached by receiving the local time from the time clocking  
21 means, acquiring a corrected time using the received local time  
22 and the time difference, and comparing the continuously acquired  
23 corrected time with the event start time; and

24           an executing means for starting to execute an event that  
25   is indicated by the event type information held by the holding  
26   means when the judging means judges that the event start time  
27   is reached.

1           15. A time managing method for a time managing apparatus  
2   that manages times clocked by a plurality of timer modules in  
3   apparatuses connected to each other on a network, the time  
4   managing apparatus comprising

5           a holding means for holding event start time information  
6   that indicates an event start time at which one or more events  
7   should be started by two or more apparatuses on the network,  
8   and the time managing method comprising:

9           a time requesting step for requesting a timer module to  
10   transmit a standard time;

11          a time receiving step for receiving the standard time;

12          a judging step for judging whether the event start time  
13   is reached, by comparing the received standard time with the  
14   event start time; and

15          an instructing step for instructing the two or more  
16   apparatuses to start executing the one or more events when the  
17   judging step judges that the event start time is reached.

1           16. A time managing method for a time managing apparatus  
2   that manages times clocked by a plurality of timer modules in  
3   apparatuses connected to each other on a network, the time  
4   managing method comprising:

5           a presetting information receiving step for receiving from  
6 outside (a) event start time information that indicates an event  
7 start time at which one or more events should be started by two  
8 or more apparatuses on the network, (b) event type information  
9 indicating an event type for each of the one or more events,  
10 and (c) apparatus identifiers of apparatuses that should execute  
11 the one or more events;

12           a time receiving step for receiving a standard time from  
13 a timer module;

14           a time managing step for managing the received standard  
15 time;

16           a presetting information transmitting step for  
17 transmitting the received event start time and event type  
18 information to the apparatuses identified by the received  
19 apparatus identifiers;

20           a standard time acquisition request receiving step for  
21 receiving a standard time acquisition request from each of the  
22 apparatuses; and

23           a standard time transmitting step for transmitting the  
24 standard time to each of the apparatuses.

1           17. A time managing method for a time managing apparatus  
2 that manages times clocked by a plurality of timer modules in  
3 apparatuses connected to each other on a network, the time  
4 managing method comprising:

5           a presetting information receiving step for receiving from  
6 outside (a) event start time information that indicates an event

7 start time at which one or more events should be started by two  
8 or more apparatuses on the network, (b) a module identifier of  
9 a timer module, (c) event type information indicating an event  
10 type for each of the one or more events, and (d) apparatus  
11 identifiers of apparatuses that should execute the one or more  
12 events;

13 a time output requesting step for requesting the timer  
14 module identified by the received module identifier to output  
15 a standard time;

16 a time receiving step for receiving the standard time from  
17 the timer module; and

18 a presetting information transmitting step for  
19 transmitting the received event start time and event type  
20 information, and transmitting the standard time, to the  
21 apparatuses identified by the received apparatus identifiers.

1 18. A time managing method for a time managing apparatus  
2 that manages times clocked by a plurality of timer modules in  
3 apparatuses connected to each other on a network, the time  
4 managing method comprising:

5 a designation receiving step for receiving designation  
6 by a user of a timer module among the plurality of timer modules,  
7 the timer module being to be used as a standard timer module  
8 for synchronization;

9 a time requesting step for requesting the designated timer  
10 module to output a standard time;

11 a time receiving step for receiving the standard time from

12 the requested timer module; and  
13 a time transmitting step for transmitting the received  
14 standard time to the other timer modules among the plurality  
15 of timer modules excluding the timer module that output the  
16 standard time, instructing the other timer modules to synchronize  
17 times thereof with the transmitted standard time.

1 19. A time managing method for a time managing apparatus  
2 that manages times clocked by a plurality of timer modules in  
3 apparatuses connected to each other on a network, the time  
4 managing method comprising:  
5 a presetting information receiving step for receiving (a)  
6 event start time information that indicates an event start time  
7 at which one or more events should be started by two or more  
8 apparatuses on the network, (b) a piece of management information,  
9 and (c) event type information indicating an event type for each  
10 of the one or more events, from an apparatus that vicariously  
11 manages the times clocked by the plurality of timer modules using  
12 different pieces of management information assigned to the  
13 plurality of timer modules;  
14 a holding step for holding the received event start time,  
15 piece of management information, and event type information;  
16 a time acquisition request transmitting step for  
17 transmitting to the apparatus a time acquisition request with  
18 the received piece of management information attached thereto;  
19 a time receiving step for receiving from the apparatus  
20 a standard time identified by the transmitted piece of management

21 information;

22 a judging step for judging whether the event start time  
23 is reached by comparing the received standard time with the event  
24 start time; and

25 an executing step for starting to execute an event that  
26 is indicated by the event type information held by the holding  
27 step when the judging step judges that the event start time is  
28 reached.

1 20. A time managing method for a time managing apparatus  
2 that manages times clocked by a plurality of timer modules in  
3 apparatuses connected to each other on a network, the time  
4 managing apparatus comprising

5 a time clocking means for clocking a local time for the  
6 time managing apparatus itself, and

7 the time managing method comprising::

8 a presetting information receiving step for receiving (a)  
9 event start time information that indicates an event start time  
10 at which one or more events should be started by two or more  
11 apparatuses on the network, (b) event type information indicating  
12 an event type for each of the one or more events, from an apparatus  
13 on the network, the presetting information receiving step also  
14 continuously receiving a standard time from a time module;

15 a time difference calculating step for calculating a time  
16 difference between the local time received from the time clocking  
17 means and the standard time;

18 a holding step for holding the received event start time

19 and type information and the calculated time difference;  
20 a judging step for judging whether the event start time  
21 is reached by receiving the local time from the time clocking  
22 means, acquiring a corrected time using the received local time  
23 and the time difference, and comparing the continuously acquired  
24 corrected time with the event start time; and  
25 an executing step for starting to execute an event that  
26 is indicated by the event type information held by the holding  
27 means when the judging means judges that the event start time  
28 is reached.

1 21. A time managing program for a time managing apparatus  
2 that manages times clocked by a plurality of timer modules in  
3 apparatuses connected to each other on a network, the time  
4 managing apparatus comprising

5 a holding means for holding event start time information  
6 that indicates an event start time at which one or more events  
7 should be started by two or more apparatuses on the network,  
8 and

9 the time managing program allowing the time managing  
10 apparatus to execute the following steps:

11 a time requesting step for requesting a timer module to  
12 transmit a standard time;

13 a time receiving step for receiving the standard time;

14 a judging step for judging whether the event start time  
15 is reached, by comparing the received standard time with the  
16 event start time; and

17           an instructing step for instructing the two or more  
18   apparatuses to start executing the one or more events when the  
19   judging step judges that the event start time is reached.

1           22. A time managing program for a time managing apparatus  
2   that manages times clocked by a plurality of timer modules in  
3   apparatuses connected to each other on a network, the time  
4   managing program allowing the time managing apparatus to execute  
5   the following steps:

6           a presetting information receiving step for receiving from  
7   outside (a) event start time information that indicates an event  
8   start time at which one or more events should be started by two  
9   or more apparatuses on the network, (b) event type information  
10   indicating an event type for each of the one or more events,  
11   and (c) apparatus identifiers of apparatuses that should execute  
12   the one or more events;

13           a time receiving step for receiving a standard time from  
14   a timer module;

15           a time managing step for managing the received standard  
16   time;

17           a presetting information transmitting step for  
18   transmitting the received event start time and event type  
19   information to the apparatuses identified by the received  
20   apparatus identifiers;

21           a standard time acquisition request receiving step for  
22   receiving a standard time acquisition request from each of the  
23   apparatuses; and



24           a standard time transmitting step for transmitting the  
25   standard time to each of the apparatuses.

1           23. A time managing program for a time managing apparatus  
2   that manages times clocked by a plurality of timer modules in  
3   apparatuses connected to each other on a network, the time  
4   managing program allowing the time managing apparatus to execute  
5   the following steps:

6           a presetting information receiving step for receiving from  
7   outside (a) event start time information that indicates an event  
8   start time at which one or more events should be started by two  
9   or more apparatuses on the network, (b) a module identifier of  
10   a timer module, (c) event type information indicating an event  
11   type for each of the one or more events, and (d) apparatus  
12   identifiers of apparatuses that should execute the one or more  
13   events;

14           a time output requesting step for requesting the timer  
15   module identified by the received module identifier to output  
16   a standard time;

17           a time receiving step for receiving the standard time from  
18   the timer module; and

19           a presetting information transmitting step for  
20   transmitting the received event start time and event type  
21   information, and transmitting the standard time, to the  
22   apparatuses identified by the received apparatus identifiers.

1           24. A time managing program for a time managing apparatus

2 that manages times clocked by a plurality of timer modules in  
3 apparatuses connected to each other on a network, the time  
4 managing program allowing the time managing apparatus to execute  
5 the following steps:

6 a designation receiving step for receiving designation  
7 by a user of a timer module among the plurality of timer modules,  
8 the timer module being to be used as a standard timer module  
9 for synchronization;

10 a time requesting step for requesting the designated timer  
11 module to output a standard time;

12 a time receiving step for receiving the standard time from  
13 the requested timer module; and

14 a time transmitting step for transmitting the received  
15 standard time to the other timer modules among the plurality  
16 of timer modules excluding the timer module that output the  
17 standard time, instructing the other timer modules to synchronize  
18 times thereof with the transmitted standard time.

1 25. A time managing program for a time managing apparatus  
2 that manages times clocked by a plurality of timer modules in  
3 apparatuses connected to each other on a network, the time  
4 managing program allowing the time managing apparatus to execute  
5 the following steps:

6 a presetting information receiving step for receiving (a)  
7 event start time information that indicates an event start time  
8 at which one or more events should be started by two or more  
9 apparatuses on the network, (b) a piece of management information,

10 and (c) event type information indicating an event type for each  
11 of the one or more events, from an apparatus that vicariously  
12 manages the times clocked by the plurality of timer modules using  
13 different pieces of management information assigned to the  
14 plurality of timer modules;

15 a holding step for holding the received event start time,  
16 piece of management information, and event type information;

17 a time acquisition request transmitting step for  
18 transmitting to the apparatus a time acquisition request with  
19 the received piece of management information attached thereto;

20 a time receiving step for receiving from the apparatus  
21 a standard time identified by the transmitted piece of management  
22 information;

23 a judging step for judging whether the event start time  
24 is reached by comparing the received standard time with the event  
25 start time; and

26 an executing step for starting to execute an event that  
27 is indicated by the event type information held by the holding  
28 means when the judging step judges that the event start time  
29 is reached.

1 26. A time managing program for a time managing apparatus  
2 that manages times clocked by a plurality of timer modules in  
3 apparatuses connected to each other on a network, the time  
4 managing apparatus comprising:

5 a time clocking means for clocking a local time for the  
6 time managing apparatus itself, and

7           the time managing program allowing the time managing  
8 apparatus to execute the following steps:

9           a presetting information receiving step for receiving (a)  
10 event start time information that indicates an event start time  
11 at which one or more events should be started by two or more  
12 apparatuses on the network, (b) event type information indicating  
13 an event type for each of the one or more events, from an apparatus  
14 on the network, the presetting information receiving step also  
15 continuously receiving a standard time from a time module;

16           a time difference calculating step for calculating a time  
17 difference between the local time received from the time clocking  
18 means and the standard time;

19           a holding step for holding the received event start time  
20 and type information and the calculated time difference;

21           a judging step for judging whether the event start time  
22 is reached by receiving the local time from the time clocking  
23 means, acquiring a corrected time using the received local time  
24 and the time difference, and comparing the continuously acquired  
25 corrected time with the event start time; and

26           an executing step for starting to execute an event that  
27 is indicated by the event type information held by the holding  
28 means when the judging step judges that the event start time  
29 is reached.